The Determinants of the Growth of Microenterprises in Central Mexico: Evidence from a Survey in Toluca

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ABSTRACT   Microenterprises (MEs) are a critical part of developing countries' economies. However, due to shortcomings in data gathering efforts, comparatively little is reliably known about these businesses. Our data result from a door-to-door survey technique and involve 450 MEs in central Mexico. Our paper represents the first effort to quantify the effect of remittances on microenterprise performance. We also examine whether access to credit affects ME growth. Our results indicate that MEs with access to remittances do not grow significantly faster than MEs without such access. Access to credit does not appear to have a significant influence on ME growth.

RÉSUMÉ   Les micro-entreprises (ME) sont une composante essentielle des économies des pays en développement. Toutefois, en raison de lacunes dans les efforts de collecte de données, relativement peu est connu de manière fiable sur ces entreprises. Nos données résultent d'une technique d'enquête porte-à-porte et recouvrent 450 ME du centre du Mexique. Notre document représente la première tentative de quantifier l'effet des envois de fonds sur le rendement des ME. Nous étudions aussi si l'accès au crédit affecte leur croissance. Nos résultats indiquent que les ME ayant accès aux envois de fonds ne croissent pas beaucoup plus rapidement que les ME sans un tel accès. L'accès au crédit ne semble pas avoir une influence significative sur la croissance des ME.

Introduction

This article examines the determinants of microenterprise (ME) growth and the effects that access to financing in general and access to remittances in particular may have on ME performance. After several decades of research, it is widely accepted that MEs are key parts of the economies of today's developing countries. A recent collection of data gathered by the International Finance Corporation (Kozak 2005) provides some illustration. Around 40% of the working-age populations of lower and upper-middle income countries are employed in businesses with 10 or fewer employees. Given that many MEs exist as part of the informal sector, or "shadow economy," these figures may understate the importance of these tiniest of businesses, particularly in lower income

countries. Ayyagari, Beck, and Demirgüç-Kunt (2005) provide estimates of the percent of GDP that comes from the shadow economy for 25 countries. This figure is above 50% for low income countries and averages nearly 30% for upper-middle income countries like Mexico.

The Mexican government statistics support the notion that small businesses are critical parts of developing country economies, providing employment and income for substantial proportions of the populace. Estimates suggest that there are approximately 3 million MEs in Mexico, representing nearly 95% of all businesses in the country.[1] In addition, MEs account for an estimated 40% of the employment in Mexico (INEGI 2004). Clearly, the ME sector is an important part of the Mexican economy, but even these numbers may understate its true impact. In much of the developing world, the informal sector is largely invisible (Liedholm and Mead 1999), and Mexico is not exceptional in this regard.

One issue that has received considerable attention is the financing of MEs in developing countries. Formal microfinance programs like *Compartamos* exist in Mexico,[2] but MEs rely on many other sorts of financing. There is an unresolved debate as to the importance of migration in ME financing in Mexico. Mexico's *Consejo Nacional de Población* (CONAPO) indicates that remittances have been used to finance MEs, but their use peaked in the 1970s and has decreased since then, becoming a relatively unimportant current source of funding (CONAPO 2000). On the other hand, Mexico's *Instituto Nacional Estadística Geográfica y Informática* (INEGI) reports that returning migrants, using income earned in the United States, finance the establishment of many MEs in Mexico (INEGI 2004). Furthermore, Woodruff and Zenteno (2001) suggest that remittances make up 20% of all investment capital for micro and small enterprises in Mexico. Migration to the United States may also be important for the development of the Mexican ME sector separate from its effect on ME financing. For instance, INEGI (2004) shows that approximately two-thirds of Mexican MEs are owned by individuals with US migration experience and that most have spent less than five years in the United States.[3] Thus, policies that encourage Mexican migration to the United States will influence the Mexican ME sector, an issue that is especially important in light of proposed changes to US immigration policy concerning temporary worker programs.

The purpose of this paper is to explore how financing and migration may affect ME performance in a developing country setting. An improved understanding of these linkages may be of considerable utility of policy-makers. Our paper adds to the existing literature in several ways. First, only recently has there been any attention paid to the role that remittances may play in ME growth, in spite of the fact that the amount of remittances is substantial and growing for many developing countries. For example, the World Bank (2008) estimates that worldwide remittances more than doubled from

1.   The Mexican government considers manufacturing firms to be MEs if they have 30 or fewer workers, retail firms if they have 5 or fewer workers, and service firms if they have 20 or fewer.

2.   See Morduch (1999) for a review of microfinance.

3.   This pattern is not recent. Diez-Cañedo (1984) indicates that 84% of migrants interviewed stated that their reason for migrating was to earn US dollars and then to return to Mexico to use the money to enhance their businesses or for personal reasons.

less than $US150 billion in 2001 to more than $US300 billion in 2007. Our paper represents the first effort to quantify in a statistically correct fashion the effect of access to remittances on ME performance. In addition, we join a small but growing literature that rigorously examines whether or not access to credit affects ME growth.[4] Our results indicate that MEs with access to remittances do not grow significantly faster than MEs without access to remittances. Furthermore, access to credit does not appear to influence ME growth in a statistically significant way. Given these results, this research suggests the need for more complete data on Mexican MEs that allow for more precise estimates of the effect of remittances over a larger sample of MEs covering a larger geographic area.

I. Literature Review

An early theoretical focus in the literature on firm growth involved Gibrat's law of proportional growth. Gibrat (1931) argued that firm growth is not affected by firm size, but rather is a seemingly random process resulting from an interaction of several factors including political trends and entrepreneurs' relative risk aversion. A number of empirical studies caused scholars to doubt the validity of this argument (particularly in the developing country setting), and so-called learning theory has largely supplanted Gibrat's work in this area. Specifically, Jovanovic (1982) proposed a model in which managers of firms learn about their efficiency over time, with firms expanding when managers' suppositions about their efficiency prove to be understatements of the true efficiency level. Learning models suggest that firm growth rates should be inversely related to firm age and the initial size of firms. Pakes and Ericson (1989) extended learning theory to allow proprietors not only to learn their true efficiency level but also to increase their firms' efficiency by means of investing in their own human capital. Most of the literature provides empirical support for learning theory and the augmented learning theory, at least in the case of developed countries. Fajnzylber, Maloney, and Montes-Rojas (2006) find that patterns of ME dynamics are broadly similar in developed and developing countries, and are generally in accordance with the theoretical literature.

While examinations of small-firm dynamics in developing countries were quite rare until the late 1980s, since that time there have been quite a number of studies in this area. Liedholm and Mead (1987), Little, Mazumdar, and Page (1987), Cortes, Berry, and Ishaq (1987), and Chuta and Liedholm (1990) present descriptive evidence from several countries suggesting that small-firm growth differs according to a number of characteristics of the firm and its proprietor. One focus in this literature has been on the relationship between growth and firm size and age. The vast majority of these studies

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4. There appears to be some evidence that the size of the influx of capital relative to the firm size may have a positive correlation with the growth experience by the firm (see McKenzie and Woodruff 2007).

have presented evidence that smaller and younger firms tend to grow faster as posited by learning theory.[5] A number of studies, including Mead and Liedholm (1998), Van der Sluis, van Praag, and Vijverberg (2005), Brown et al. (2005), Atoken, Sawada, and Otsuka (2006), and Akoten and Otsuka (2007), have also found evidence that human capital embodied in the proprietor or its workers (usually measured as education, age, or experience) promotes firm growth.

In addition to human capital that may be embodied in proprietors or those working in firms, another characteristic that may be a causal factor in the performance of firms is proprietor gender. Discrimination of one sort or another may be one possible explanation of this phenomenon. For instance, women-run MEs may by social convention be largely restricted to slower growing sectors. Alternatively, customer discrimination may play a role in some cases. However, Downing and Daniels (1992) suggest alternative explanations: perhaps the domestic responsibilities of women may cause them to have different business objectives or to be more risk averse than their male counterparts. Evidence suggests that firms with female proprietors do grow more slowly (McPherson 1996; Goedhuys and Sleuwaegen 2000). In addition, proprietor ethnicity is suggested by Ramachandran and Shah (1999) as a significant causal factor in growth regressions.

The degree of ME formality is another area of focus in the literature. There are reasons to expect that the degree to which a business is formal may affect its growth. Presumably, businesses that have joined the formal sector are better able to borrow when the need arises and might be better positioned to attract new customers through advertising. Sleuwaegen and Goedhuys (2002) summarize the organizational ecology literature that argues that formalization gives businesses legitimacy and better reputations in the eyes of their customers. McPherson and Liedholm (1996) examine the determinants of ME registration. Sleuwaegen and Goedhuys (2002), Goedhuys and Sleuwaegen (2000), and Deininger, Jin, and Sur (2007) find that formalized MEs grow faster than those that are informal, controlling for the endogeneity of formalization. Ethnicity may also influence the degree of formality, a possibility suggested by Bigsten, Kimuyu, and Lundvall (2000).

Empirical work in this area has also found that a firm's location and the sector in which it operates affect its growth prospects. Presumably, firm location may affect performance according to proximity to customers. In addition, a firm's location also plays a role in determining how much competition it faces and how costly it may be to buy inputs. Similarly, some types of business may face less competition because of high barriers to entry or be more or less profitable because of demand side conditions.

A recent debate in the literature involves constraints to ME growth. Historically, it has been assumed that a lack of access to financing significantly retards growth. While it is certainly plausible that a firm that can borrow may be better able to take advantage

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5.   See, for example, McPherson (1996), Ramachandran and Shah (1999), Sleuwaegen and Goedhuys (2002), Rodríguez et al. (2003), van Biesebroeck (2005), and Deininger, Jin, and Sur (2007). Shanmugam and Bhaduri (2002) and Goedhuys and Sleuwaegen (2000) are exceptions: they find growth is not inversely related to firm age.

of opportunities by investing (and thereby expand), it is also possible that firm growth is more strongly influenced by other factors (for example entrepreneurial zeal), with growth actually affecting a firm's probability of getting a loan rather than the other way around. There is also new evidence that the relative influx of financial capital relative to the size of the firm helps determine profitability (McKenzie and Woodruff 2007, and Cotler and Woodruff 2008). It is also important to realize that remittances from friends or family working abroad may serve as a substitute for or an augmentation of loans. Indeed, Woodruff (2007) finds that migration rates are positively associated with investment in MEs. In short, MEs with access to remittances may be more likely to grow than those without such access.

In their study of small Romanian firms, Brown et al. (2005) find evidence in support of this contention: a doubling of the size of loans would increase employment growth rates by 4% per annum. Nugent (1996) found evidence that observed changes in the size distribution of firms in Korea are due in part to changes in access to formal credit sources. On the other hand, in their study of five transition economies, Johnson, McMillan, and Woodruff (2000) present evidence that the lack of access to finance does not constrain growth. Instead, characteristics of the business environment, notably the degree of security of property rights, appear to have the largest effects on the growth of small firms. Akoten, Sawada, and Otsuka (2006) produce similar findings for Kenyan firms. Nevertheless, most studies fail to take into account that firms that grow rapidly for other reasons may be more likely to qualify for credit. Controlling for this type of endogeneity, McPherson and Rous (2008) find that the businesses that have had loans do not have better growth prospects.

Finally, recent empirical work has recognized the possibility of sample selection bias. That is, some research does not allow for the inevitable fact that some MEs shut down. If the characteristics of failed firms are different than those that do not fail, an econometric analysis will yield biased estimates of the determinants of growth. Many studies of small-firm growth recognize this possibility, but data constraints preclude any statistical control for it (Sleuwaegen and Goedhuys 2002; Shanmugam and Bhaduri 2002; and Johnson, McMillan, and Woodruff 2000). McPherson (1996) found no evidence of sample selection bias in a sample of firms from countries in southern Africa. However, using Japanese data, Yasuda (2005) reports sample selection bias in some specifications. Similarly, Tedeschi (2008) found evidence of sample selection bias in her study of microfinance in Peru.

II. Data

Information about MEs in developing countries is usually inaccurate, hampered by the fact that many operate informally, thus normally defying the efforts of government statistical bureaus to learn about them. For example, the Mexican government conducts a survey of MEs (*La Encuesta National de Micronegocios*), but this only cap-

tures data on MEs in several of the larger urban areas.[6] Our data come from a survey in which enumerators visited every house and shop, investigating at each whether or not an ME is in operation. This data collection technique, commonly known as the GEMINI method, was pioneered by researchers at Michigan State University in the late 1980s. For a complete discussion of this methodology, see McPherson and Parker (1993). The data on which the present analysis is based represent the first application of the GEMINI methodology in Mexico.

Although definitions of MEs vary, we employ the definition used most often in the literature—that is, an ME is a firm with 10 or fewer employees.[7] Our sample includes useable information on 419 existing and 40 now closed MEs, gathered by a team of enumerators from the Autonomous University of the State of Mexico (*Universidad Autónoma del Estado de México*, UAEM) during May 2008. The survey was carried out in areas in the city of Toluca (the capital city of Estado de México), several peri-urban sites near Toluca, and in a small town some 40 kilometres away. Given the geographic extent of the survey, our results are only representative of the area around the city of Toluca. Table 1 reports summary statistics for existing and closed MEs.[8] The existing ME survey was purposely designed to be more extensive than the closed ME survey, so that some measures are not available for closed enterprises. As Figure 1 demonstrates, most enterprises in our sample are quite small—nearly 80% have two or fewer workers. Table 2 presents the distribution of business types in our sample. About half of all businesses are engaged in vending or retailing. Just under 20% are service providers (most commonly hairdressers and barbers and personal service providers like attorneys), and the balance are small scale manufacturers (in this sample, *tortillerías* and other sorts of food preparers are the most common).

6.   In fact, a major problem with this survey is that it is conducted as part of the national employment survey and thus the sampling is based on registered business.

7.   Given this definition, a business that grows substantially could qualify as an ME at inception but not at the current time. In such cases, classification as an ME is problematic. Fortunately, we are not faced with this circumstance in the sample since none of the businesses surveyed grew beyond 10 workers.

8.   The survey instruments (English and Spanish versions of the existing and closed business surveys) are available from the authors upon request. The existing enterprise survey is essentially the GEMINI instrument adjusted for Mexican institutional and cultural issues and augmented with questions regarding immigration and remittances. The closed business survey is a much shortened version of the existing ME survey and is used primarily to gauge the degree of sample selection bias.

Table 1. Descriptive Statistics
Mean (Standard Deviation)

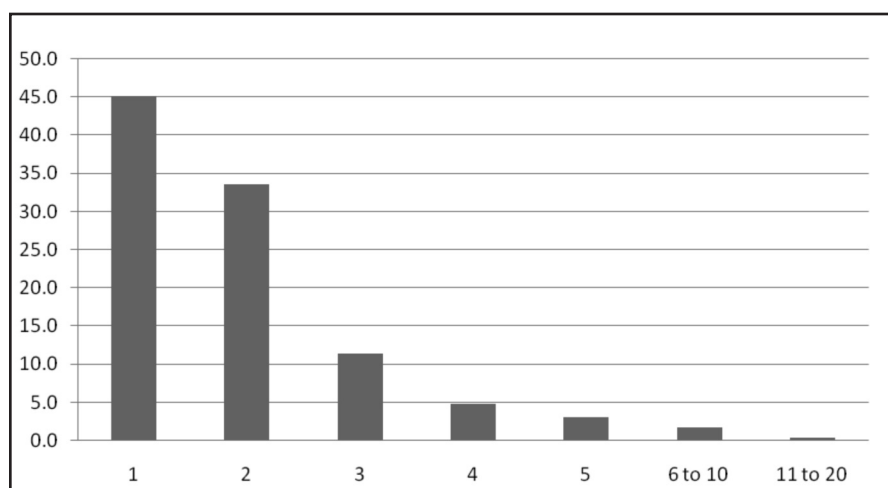| Variable	Existing Businesses n=419	Closed Businesses n=40
Dependent Variable		
Growth	7.58 (28.24)	4.83 (31.98)
Independent Variables		
Initial Firm Size	1.68 (0.94)	1.80 (1.51)
Firm Age	5.72 (7.14)	4.89 (6.03)
Commerce	0.58 (0.49)	0.80 (0.41)
Services	0.22 (0.42)	0.08 (0.27)
Residential Area	0.39 (0.49)	0.23 (0.42)
Commercial District	0.11 (0.32)	0.18 (0.38)
Urban Area	0.57 (0.50)	0.55 (0.50)
Primary Education	0.20 (0.40)	0.20 (0.41)
Secondary Education	0.51 (0.50)	0.55 (0.50)
University Education	0.18 (0.38)	0.18 (0.38)
Female Owner	0.48 (0.50)	0.60 (0.50)
Remittances	0.16 (0.37)	0.00 (0.00)
Training	0.84 (0.36)	
Hacienda	0.53 (0.50)	
Records	0.38 (0.49)	
Capital	0.78 (0.41)	
Loan	0.11 (0.31)	

Figure 1. Number of Workers (% of all Businesses)

Table 2: Business Types (% of Total)

Business Type	Existing Businesses (n=419)	Closed Businesses (n=40)	All Businesses (n=459)
Textile production/processing	1.4	2.5	1.5
Wood/wood products	1.0	0.0	0.9
Metalwork	1.0	0.0	0.9
Repair work	3.6	2.5	3.5
Leatherwork	1.0	0.0	0.9
Food and beverage production/processing	9.8	7.5	9.6
Non-metallic mineral processing	0.2	0.0	0.2
Other manufacturing	1.2	0.0	1.1
Vending	12.9	30.0	14.4
Retailing and wholesaling	45.6	50.0	46.0
Hotels, restaurants, bars	1.2	2.5	1.3
Construction	1.4	0.0	1.3
Services	19.8	5.0	18.5
Total	100.0	100.0	100.0

The purpose of this study is to determine those factors that affect growth in our sample of Mexican MEs. Firm growth can be measured in a number of ways, including growth in assets, annual sales or profits, and employment. Employment growth is the most commonly used measure, mainly because most research has been based on recall data and proprietors remember fluctuations in the number of workers more accurately than changes in sales, assets, or profits. In addition, analyzing ME growth in terms of employment allows the researcher to measure the effect of ME growth on the number of jobs available in this sector. Therefore, our dependent variable (*growth*) is the average annual percentage change in the number of workers since the ME began operating.[9]

As reported in Table 1, the average existing firm in our sample grew at just better than 7.5% per year. It should be noted that this average growth rate masks the fact that 76% of existing firms (321 out of 419) report no growth since inception and about 4% (15) report negative growth. Thus, the remaining 83 firms (20% of the existing sample) grew at a rate much faster than the average; in fact, the average rate of growth for firms that do grow is 39.5%. Comparing existing to closed MEs, we find that closed MEs grew at a slower pace than existing MEs. In addition, almost 90% of closed businesses in our sample experienced zero employment growth during their existence. As noted, because recall of sales over the lifetime of a business is likely to be inaccurate, we do not mea-

9. This includes working proprietors, paid and unpaid workers, and apprentices. Some researchers have explored the determinants of small-firm growth using both sales and employment as dependent variables. Sleuwaegen and Goedhuys (2002) and Johnson, McMillan, and Woodruff (2000) report broadly similar results for the alternative specifications.

sure growth in this way. Nevertheless, our survey did generate estimates of sales over the past year for existing businesses. On average, sales ranged from $23 to $142,000 per year, with a median value of about $7,900.

Initial Firm Size is the number of workers (including any working proprietors) at the inception of the business. *Firm Age* is the number of years since inception. Unsurprisingly, MEs in our sample started quite small, with both existing firms and now closed firms averaging fewer than two. Our sample mainly comprises relatively young firms: existing firms range from less than a year to 45 years and average just fewer than 6 years. Defunct businesses survived for an average of 4.8 years. The majority of businesses are (or were) engaged in *Commerce*, most commonly small vendors. The remainder is spread between providers of *Services* and small scale manufacturing firms (excluded category = manufacturing).

MEs are quite varied with respect to their spatial attributes. The most common location is along roads or mobile: more than 50% of the firms in our sample are of this nature. Another large proportion carried out their activities in a *Residential Area*; the remainder were in a more formalized *Commercial District* (excluded category = roadside or mobile). Slightly more than half of existing and closed MEs were found in *Urban* areas; the rest were in peri-urban or small town milieus (excluded category = peri-urban or small town). MEs report the formal educational levels of owners (excluded category = no formal education). About one in five MEs reports that the owner has a *Primary Education*. The most common reported is *Secondary Education*, but in 18% of businesses the owner is even better educated. In addition, the majority of existing businesses (84%) have workers and owners that have had some sort of business related *Training* in addition to formal education. Finally, just under half of existing MEs and 60% of closed businesses have at least one female proprietor.

As noted above, the earlier literature has often found that more formal firms grow more rapidly. Formality in the Mexican context is not entirely straightforward. Businesses are required by law to register with *Secretaría de Hacienda y Crédito Público* (essentially the equivalent of the US Treasury). Being registered with *Hacienda* is a way for the firm to establish its tax number and is an important requirement in obtaining access to formal credit. A little more than half of our sample is part of the formal sector, according to this definition. An alternative measure of formality is whether or not the business has some sort of formal accounting system and keeps financial *Records*. In the sample, 38% of the existing firms are formal in this sense. *Hacienda* and *Records* are not mutually exclusive; specifically, of those MEs that are formal by the *Hacienda* definition, only 59% keep formal accounting *Records*, while 14% of MEs that are informal by the *Hacienda* definition keep financial *Records*.[10]

Access to funding to finance a business should have a positive impact on ME growth. One source of such funding is a financial institution, although the literature is divided

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10.   The definition of informality becomes even more complicated because employers who have paid workers are required to pay into taxes to the Mexican version of Social Security (*Instituto Mexicano del Seguro Social*). Given that many proprietors of MEs are the only workers, this information is not used in the current study to establish formality of a business.

as to its importance in determining growth. In our sample of existing Mexican MEs, 11% report having received a *Loan* for business purposes from a financial institution. For businesses receiving loans, amounts borrowed were relatively small, ranging from as little as $200 to as much as $9,600. The median loan was for just under $1,000. As discussed above, remittances are another potential source of financial capital. While none of the 40 closed MEs reported having access to funds remitted to Mexico from the United States, 16% of existing MEs did. This data is interesting since according to the 2000 census less than 2% of the population in the state has immigrated. In terms of remittances, the state is ranked in the middle of Mexican states. Based on these facts one could conclude that remittances are over-represented in MEs relative to the overall population. This 16% is also in line with the results obtained by Woodruff and Zenteno (2001): they found remittances accounted for 20% of all investment capital for micro and small enterprises in Mexico. These remittances were either sent by the proprietor or a family member. Unfortunately, detailed data on the amount and uses of remittances are unavailable. Therefore, we construct a dichotomous indicator of access to *Remittances* equal to one for those businesses that report having access.[11] We also include a crude measure of the level of physical capitalization of the ME. *Capital* is a dummy variable taking on a value of one if the business owns fixed capital and zero otherwise. More than three-quarters of the MEs in our sample own capital.

III. Estimation and Results

We estimate a model of firm growth that is similar to that in the previous literature. Our study differs from past research in that ours is the first to analyze MEs in central Mexico using the GEMINI methodology and in that ours takes advantage of the data on closed businesses to minimize the impact of sample selection. The estimated coefficients from two growth equation OLS regressions are presented in Table 3.[12] The first column of Table 3 reports estimates employing all 459 observations of existing and closed MEs, while the second column reports estimates using only observations of existing MEs. The columns also differ in the number of independent variables, due to differences in the two surveys that generated the data. The results in column one are reported mainly to indicate the potential impact of sample selection. Specifically, the small and statistically insignificant coefficient on *Open* (equals one if the ME is part of the existing sample) indicates that there is no difference between the closed ME sample and the existing ME sample in terms of average growth rates, controlling for the independent variables. This result can be interpreted as evidence that sample selection

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11.   Enumerators asked business owners to give details about remittances, but the respondents declined to respond in almost all cases. In addition, respondents were asked about remittances from other countries, but only evidence of remittances from the US was uncovered.

12.   As discussed above, a firm's access to credit may be endogenous. In the present case, we find that credit access is exogenous. These results are available from the authors. Access to remittances may also be endogenous, but again we find no statistical evidence to support this hypothesis.

Table 3. Growth Regression Results
Coefficient (t-statistic)

Variable	Existing and Closed Businesses n=459	Existing Businesses Only n=419
Initial Firm Size	-1.745 (-1.30)	-2.764* (-1.85)
Firm Age	-0.491*** (-2.52)	-0.605*** (-3.01)
Commerce	-5.486 (-1.49)	-9.005** (-2.36)
Services	0.123 (0.03)	-2.459 (-0.56)
Residential Area	6.020* (1.89)	2.661 (0.79)
Commercial District	2.312 (0.54)	1.388 (0.31)
Urban Area	-1.039 (-0.32)	-0.836 (-0.25)
Primary Education	-5.840 (-1.16)	-4.094 (-0.80)
Secondary Education	-7.930* (-1.76)	-8.128* (-1.77)
University Education	-7.564 (-1.41)	-12.23** (-2.20)
Female Owner	-5.299* (-1.91)	-5.525** (-1.95)
Remittances	2.663 (0.70)	2.540 (0.68)
Training		-7.116 (-1.59)
Hacienda		6.364** (2.05)
Records		5.801* (1.79)
Capital		-7.685** (-2.13)
Loan		2.162 (0.49)
Open	-0.445 (-0.09)	
Constant	23.60*** (3.12)	35.54*** (4.69)
adjusted R2	0.051	0.103

* Significant at 10% level
 ** Significant at 5% level
 *** Significant at 1% level

does not exist in a statistical sense, which further suggests that estimates using only the sample of existing MEs would not be biased by sample selection. In addition, a Chow-type test of the appropriateness of pooling the two samples (available from the authors) indicates that there are no statistical differences between estimates of the growth equation using the closed ME sample and the open ME sample. This suggests that sample selection bias is not an important issue.

When comparing column one to column two, there are some differences in estimated coefficients and levels of significance; however, this is due to the inclusion of additional regressors in column two, not sample selection bias. The discussion that follows concentrates on the results in column two of Table 3.

The inverse relationship between firm growth and firm size and age, commonly found in the earlier literature, also reveals itself here. Sector also matters: businesses involved in commercial activities experience 9% lower growth than manufacturing firms. Location, however, seems to confer no particular advantage or disadvantage in terms of growth. Female-run MEs appear to grow at an average annual rate that is 5.5% lower than those run by males, a result that is generally consistent with the literature. It is not obvious why this should be the case, but different objectives and constraints for women entrepreneurs no doubt play some role.[13] Furthermore, given the sample size, we are unable to control for the different types of businesses within the general categories of commerce, services, and manufacturing; perhaps the effect of female ownership is associated with the types of businesses women tend to own. Controlling for all other factors, MEs having fixed assets grow more slowly than those that do not have fixed assets, a significant result in both the economic and statistical senses. This may indicate the substitutability of capital and labour, with MEs that have greater endowments of capital choosing to not add additional workers.

There is limited evidence that human capital embodied in the proprietor or workers affects growth, although the direction of the effect is surprising. All of the included categories are shown to grow more slowly than firms in which the workers are mostly uneducated, although only two categories are statistically significant. Specifically, firms in which the proprietor has either a *Secondary Education* or a *University Education* grow substantially more slowly than MEs with an uneducated owner. The MEs of proprietors with only a primary education also grow more slowly, but the estimated coefficient is not statistically significant. Perhaps this result reflects the type of businesses owned by relatively highly educated individuals. Furthermore, *University Education* has the largest impact of all the independent variables; specifically, these firms are estimated to grow more than 12% more slowly than the excluded category. Of the 45 MEs with university educated owners, 43 are small-scale operations having two or fewer workers (including the owner), 33 of those being single-person operations. It is not clear why this is the case, but it appears that proprietors with a *University Education* run small-scale MEs that do not grow over time. It is likely that this variable is picking up an effect related to the type of business run by university educated owners rather than the effect

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13.   See Mead and Liedholm (1998) for a summary.

of human capital on growth.[14] Furthermore, those MEs with trained workers also grow more slowly. This result is consistent with the results regarding educational levels, but it is not consistent with a hypothesis that more human capital leads to more growth. Perhaps this variable is measuring the tradeoff available between skilled (i.e., trained) and unskilled workers, and firms that choose to employ skilled workers need fewer of them to produce the demanded output.

As expected, formality has a strong, positive effect on growth. Businesses that are registered with *Hacienda* grow 6% more rapidly than the unregistered, and those that keep books also tend to have better growth prospects. These businesses may be better positioned to take advantage of growth opportunities by borrowing against future revenue and may be able to advertise more extensively than informal MEs. According to Sleuwaegen and Goedhuys (2002), formalization increases businesses' legitimacy and reputation in the eyes of their customers. In any event, in our sample, formalization seems to exert a powerful, pro-growth effect.

Finally, the results in Table 3 provide interesting details about the effects of an ME's access to finance on its growth profile. The results indicate an insignificant positive effect for access to credit on ME growth. This may mean that access to credit is not an especially important determinant of credit, a finding echoed elsewhere in the recent literature (Akoten, Sawada, and Otsuka 2006; McPherson and Rous 2008). Furthermore, access to financing through remittances does not appear to significantly increase growth rates. Given the limited information on remittances available in our data, this result is far from definitive.[15]

Conclusions and Policy Implications

Research into the dynamics of MEs in developing countries is still relatively young. Still, much has been learned about MEs over the past three decades, and this research has shaped ongoing efforts by policy-makers to maximize the potential of this sector in the economic development process. It is by now largely beyond dispute that MEs form a critically important part of developing country economies, generating employment and income for large proportions of the populations. Understanding what factors cause

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14.   One explanation may be that university educated proprietors are likely to have small-scale professional services (such as doctors, dentists, lawyers, pharmacists, or teachers) operating out of their homes, and such MEs are less likely to have growth in employment because this would likely involve taking on a partner—a much more dramatic step than growth in other sorts of MEs. However, only 9 of the 45 MEs (20%) offer professional services. The remaining 80% are evenly spread among services and commercial activities (although not manufacturing).

15.   Several other specifications of the growth equation were estimated and are available from the authors. Among the other independent variables examined were owner's years of experience, existence of signage, whether owner or family member worked in the United States, existence of problems with suppliers or customers, detailed indicators of owner gender and ownership structure, less aggregated measures of industry type, amount of loan obtained, and monetary value of property.

MEs to grow, especially in terms of employment, is crucial to the design and implementation of effective programs and policies.

We analyze data collected in the state of Mexico, both in the city of Toluca and in outlying communities. Our data, collected using a method designed to capture both formal and informal firms, involves more than 400 existing enterprises, along with another 40 now closed businesses. The data collection methodology allows us to investigate the issue of sample selection bias, an issue most of the earlier literature has been unable to address. We find much evidence that supports earlier findings, including the inverse relationships between firm and size, and firm growth rates. The sector in which a firm operates also matters—in this case, firms engaged in commerce grow more slowly than firms in manufacturing. We find some evidence of substitutability between labour and capital: MEs with fixed capital have employment growth rates that are significantly lower than firms without capital. We also find that female-run MEs exhibit slower growth rates, although the specific reasons for this remain open for debate. Perhaps unsurprisingly, more formalized firms grow more rapidly than those in the informal sector.

A principal aim of this research is to examine the effects of credit and access to remittances on firm performance. We find access to credit is not endogenous, a concern in earlier work in the area. However, there is no evidence that MEs with access to formal sector loans grow any faster than those without such access. In general this parallels the findings of recent research. Interestingly, the measured effect of access to remittances on ME growth is statistically insignificant and of a similarly modest magnitude. Nevertheless, given the ubiquity of MEs in Mexico and the importance of ME financing as a vehicle for development, the issue deserves more analysis using data sets representative of more extensive geographical areas.

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